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## **The Current State of Agile UX in the Danish Industry**

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# **The Current State of Agile UX in the Danish Industry**

- the analysis

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Made in collaboration with Aalborg University and Radiometer Medical ApS

# Prolog

The booklet is a summing up of interviews made with eight Danish companies concerning their use of user experience methodologies, agile development and their experiences with a possible integration of these two.

The underlying investigation is the first part of an industrial PhD, which objective is to investigate how to integrate user experience methodologies in an agile software development. The project is made in collaboration with Aalborg University and Radiometer Medical ApS.

Supervisors: Lars Bo Larsen (AAU) and Sune Yndgaard Sørensen (Radiometer Medical)

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## Acknowledgements

I would like to thank the people, who have taken time to talk with me – without you this investigation could not have been conducted.

It is possible to contact most of the interviewees from the study. Their e-mail addresses can be found in Appendix II.

# Introduction

The focus on user experience design is increasing and this new focus is becoming a parameter that potentially can distinguish a company's products from the products of competitors. Since many software projects nowadays are developed within an agile development environment, it is of interest to investigate how companies work with both UX design and agile development, but also investigate if and maybe how they integrate these two. Such an implementation is of significant interest to developers and companies, who want to achieve synergy, a synchronous development process and essentially develop products with a higher quality faster.

## Executive Summary

After having observed how user experience design and agile development were conducted at Radiometer Medical ApS, together with the different challenges and opportunities such development caused, the next step was to investigate if other Danish companies face or have faced some of the same obstacles as Radiometer. To form a baseline for the PhD project, interviews were carried out with nine interviewees from eight different Danish companies. This was done in order to investigate how far the Danish industry has come both working with UX design and agile development, but also the implementation of these two. Furthermore it was done to examine which challenges and opportunities the companies have experienced when doing so.

It was found that not all the companies use the terminology from usability and UX design, however when talking with them, it was clear that they did perform usability and UX work. Furthermore it was found that the focus on UX design within the companies have started as a grass root movement in either the software development team or the mechanics team. UX design is often in the decision loops within the companies, but due to a lack of described UX processes this is very difficult. The companies are aware of the missing UX processes and are working on having the UX work formalized, but there is still a way to go. Even though two of the companies did not have UX employees, they made UX work and UX design was an integral part of the decisions when making decision within their development processes, this indicates that UX work not necessary is dependent on UX employees.

The companies have taken Scrum development to heart and the tendency is that they stick to it. The interviewees were positive about having user experience design and agile development integrate. So it seems that the Danish industry embraces agile UX, but there is a long way to go before such an integration is fully done and the first step on the road will be to make a described UX process.

# Infobox:

## Definition of usability and user experience

There are different approaches when it comes to distinguish between usability and UX, however all of the approaches agree upon UX originating from usability and the change from usability towards UX includes a more positive, holistic, non-instrumental and hedonic view. However a common definition of UX is still not found. The chosen definition of UX in the present work is that UX is an addition to traditional usability and therefore closely related, but separate concepts, see figure 1.

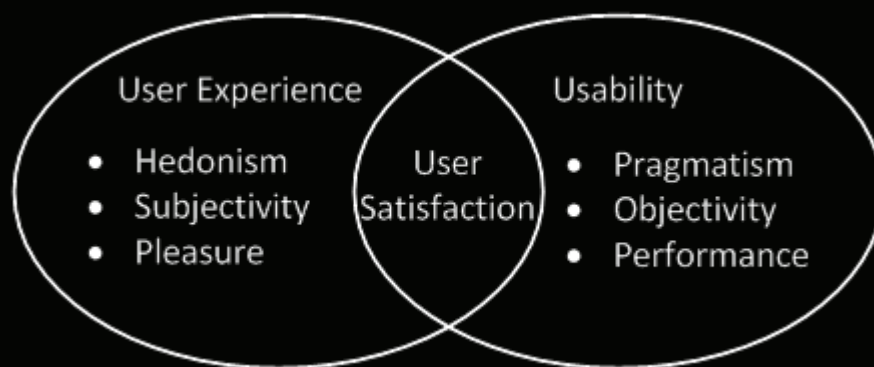


Figure 1: UX and usability as two separate, but related concepts. [Moczarny et al, 2012]

To be able to describe UX, usability should therefore be explained.

## Usability

Usability is by the ISO (1998) standard defined as: *“The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.”* Usability focuses on the ease of use and learnability, efficiency, effectiveness etc. of a product and on how the interaction can be measured. Usability often focuses on executing tests with the focus on removing inferior and non-usable elements from a product. Focus is on the efficiency of using the product rather than understanding how people experience the product.

# User experience

UX in the contrary is defined by the ISO (2010) standard as: “A *person’s perceptions and responses that result from the use and/or anticipated use of a product, system or service.*” In the User Experience White Paper by Roto et al. (2011) the term user experience is defined as: “An *encounter with a system that has a beginning and an end. It refers to an overall designation of how people have experienced (verb) a period of encountering a system.*” When dealing with the concept of UX three main factors can be classified:

1. Context: It is of importance to have in mind, that UX may change when the context changes.
2. User: The user is dynamic, hence UX is dynamic.
3. System: The UX properties designed into the product is important.

[Roto et al. 2011]

A fourth factor to have in mind, when working with UX, is as mentioned in the ISO standard and by the Roto et al. (2011), the time perspective. It is important to have in mind the different perspectives of UX design regarding the specific period of activities - the periods can be divided into; before usage, during usage, after usage, see figure 2.

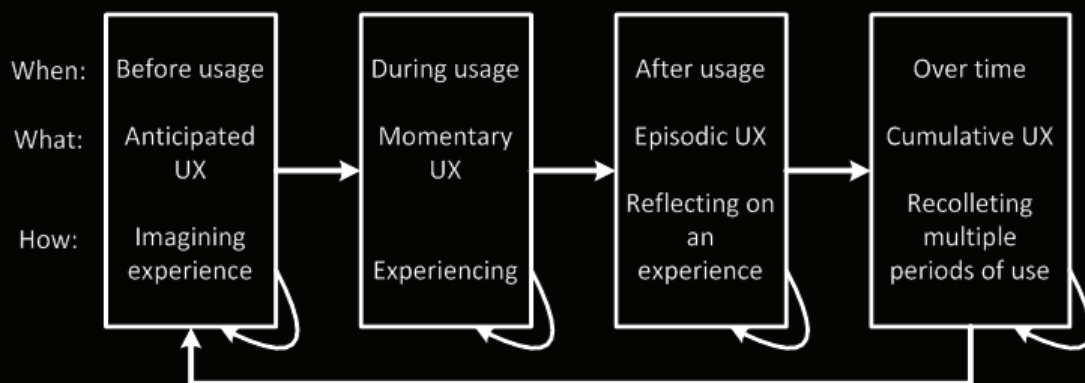


Figure 2: The different time spans of UX, the kind of UX related to the spans and the user's cognitive responses to the different time spans. [Roto et al, 2011]

This model can be seen as the UX life cycle of a product; from the first encounter with the product (or even the expectation of it), over actually using the product, to reflecting over the usage of the product and in the end summing up the whole UX of the product. It is important to have in mind, that previous experience can influence a future experience and that there are different demands to design and evaluate the UX regarding to where in the UX life cycle the focus is lying. [Roto et al, 2011]

# Research method

To investigate where the Danish industry is regarding user experience design, agile development and a possible integration of the two, it was chosen to make interviews with different Danish companies. To do so a phenomenology approach was chosen to generate knowledge about how people in the companies have experienced working with UX design, agile development and how they (maybe) have made them work together. By using a qualitative approach instead of a quantitative, it is possible to have more details and more explanations of why the companies do as they do. Furthermore the study is an explorative study, which means that there at the beginning of the study is not enough knowledge of the research field to formulate e.g. a questionnaire and the risk of asking the wrong questions massive. By using a phenomenological approach it is possible to reduce individual experiences with this work and be able to make a universal description of this work. [Creswell, 2007]

Moustakas (1994) has described the scientific work process approach, when working with phenomenology, in six steps:

1. Discover subjects and questions
2. Make interviews (in this case talk with people)
3. Assemble criteria that locates participants and/or co-researchers
4. Make interview guide
5. Carry out interviews
6. Organize and analyze data.

[Brinkmann and Tanggaard, 2010]

These six steps are to guide the reader through the analysis of where the Danish industry is today in the integration of user experience methodologies and agile development.

# **The Six Steps**





# Step 1: Discover subjects and questions

The first step is to discover subjects and questions. This was done by observations conducted at Radiometer Medical ApS in the period from the 1st of August 2012 to the 31st of December 2012. Here it was possible during the daily work to observe how Radiometer on a daily basis works with both user experience design and agile development – more specific Scrum. Besides the daily work, observations were also conducted at a design workshop at Radiometer's design partner in Munich, an intern design workshop, an animation workshop, an expert review and at a software seminar.

It was observed that almost all UX knowledge was in the heads of two people. Furthermore, it was observed that there was a lack of described processes within the UX field, both in relation to general work with UX, how to test UX and how to communicate results and knowledge within the field of UX to other departments. Regarding the agile development within the software team, the team has for four years worked with Scrum, and there was not observed any problems regarding this work.

# Step 2: Make interviews (or in this case talk with people)

The second step is to make interviews. During the observation period at Radiometer Medical ApS there was time to talk with a lot of people working within the fields of usability, user experience design, concept design, software development, design in general etc. These discussions supported the observations made and furthermore lead the attention to things, which had not been noticed - especially regarding a lack of transparency between the different departments and their processes.

# Infobox: UX maturity

The term UX maturity is important to understand the analysis. When using the term maturity model in relation to UX, it is a model that illustrates the process from a company's hostility against UX design up to where a company sees UX design as an integrated part or even the motive power within the product development.

Nielsen (2006a; 2006b) has made a maturity model regarding usability. This model together with a model put forward by Temkin (2008) is translated to suit the maturity levels of UX design and is used as the foundation for a UX maturity model, see next page. A UX maturity model gives the company the opportunities to both evaluate their current UX level, but it can also act as a guideline to determine the next step to take if the company aims for a higher level of UX maturity. An important thing to mention when talking about UX maturity is that not all companies should aim for the highest maturity level – it all depends on the company and what kind of products the company is developing. Since it is fairly universal how organizations progress through the levels of UX maturity, it is possible to match one's organization with one of the levels in the model and then be able to see what the next step is likely to be regarding UX design. [Nielsen, 2006a]

# UX maturity model

Level	Characteristics	Description
8	Embedded UX	UX design affects the corporate strategy, and UX activities are beyond design.
7	Integrated UX	UX is integrated and used in every phase of the development process and the company begins to use UX data to determine what should be developed.
6	Systematic UX process	UX design is used systematic and consistent in the company and there exist multiple activities and milestones. The company has a UX design standard or a centralized definition of preferred design patterns.
5	Managed UX	An official UX group exists and a UX manager has the overall view over the UX activities throughout the company and products. However, UX design is not incorporated in the business model, but work is done to incorporate UX across the company.
4	UX breakthrough	Management has noticed the ad hoc UX work and UX work gets a budget. UX work is now planned and the company relays on UX results.
3	UX grass root movement	Ad hoc UX is the main theme at this level. A UX grass root movement is grabbing the “low-hanging fruits” and is beginning to conduct simple in-house user tests.
2	UX interest	UX design is recognized, but UX work is developer-driven. The developers have to rely on their own intuition, personal judgment and logic.
1	Hostility towards UX	“A good user is a dead user” describes this level very well.  A company often has to have had a design catastrophe before the management is ready to consider working with UX design.

Figure 3: UX maturity model based on the usability models by Nielsen (2006a), Nielsen (2006b) and Temkin (2008)

# Step 3: Assemble criteria that locates participants and/or co-researchers

The third step is to assemble criteria that locate participants and co-researchers. A lot of literature regarding the research field was gone through and it was found that there were a great interest for working with user experience design and what such work can contribute with in a development process. Furthermore the literature stated different attempts to make an integration of user experience methodologies and agile development. The most common approach is to work with sprint zero, this is described by Sy (2007), Kollmann (2008) and Beyer (2010), see appendix I. Other approaches are: a satellite approach described by Kollmann (2008), UScrum described by Singh (2008) and Lean UX described by Gothelf (2013), see appendix I. None of the attempts have succeeded in making a fully integration, meaning that the user experience work was done synchronous with the development in each sprint. When going through the literature, it was considered which selection criteria the companies should be selected on.

## Selection criteria

The companies were selected on basis of:

- Companies that develop software and companies producing software and physical products
- Different sizes companies
- Companies with different UX maturity levels

## The companies

Atosho, BAE Systems Detica GCS, Brüel&Kjær, FOSS Analytical, GN Netcom, NN (wishes to be anonymous), Radiometer Medical and TC Electronic.

For a presentation of the companies and the interviewees, see appendix II.

# Step 4: Make an interview guide (the research questions)

The fourth step is to make an interview guide. An interview guide was developed on basis on the observations conducted at Radiometer Medical ApS (step 1 and 2) and from the literature review (step 3).

The interviews were to give an insight to how user experience methodologies and agile development are used within the companies and contribute to an understanding of the possibilities that exists to change the status quo regarding the integration of the two.

The interviews were to answer the following research questions:

- **What is the common approach for the companies to start having an interest in user experience design?**
- **How do the companies make decisions within the user experience field and is a decision made within this field as powerful as decisions made e.g. within software?**
- **How do the companies work with user experience (in an agile development)?**
- **Has the companies taken agile development to heart?**
- **Do the companies embrace agile UX?**

# Step 5: Carry out interviews

The fifth step is to carry out interviews. The interviews were conducted as semi-structured explorative interviews. The interview guide was used as a guideline for the interviews, but not followed exactly point by point. This approach was chosen to broaden the interviews and make the interviews develop during the talk. The interviews were completed with nine participants from eight Danish companies. One consultant company was also interviewed, but the data from this interview are not included in the present analysis due to the selection criteria. All interviews were carried out face-to-face. The interviews took between 44 and 105 minutes. All interviews were recorded and afterwards transcribed. No notes were taken during the interview in order to have maximum focus on the flow of the conversation. The interviews were conducted in Danish and translated to English for this analysis.

# Step 6: Organize and analyze data

**Step 1;** Compiling: The purpose of this step was to compile all the collected data and organize it systematically. This was done by a transcription of approximately 8 hours and 54 minutes of audio files recorded from the eight interviews, this resulted in 109 written pages.

**Step 2;** Disassembling: The purpose of this step was to break down the compiled data into smaller fragments or pieces. If a fragment or pieces had a double meaning it was doubled and a note was made on it to tell that it was in two pools. This process resulted in 528 statements.

**Step 3;** Reassembling: The purpose of this step was to look for patterns in the statements; such patterns can reveal new and important insights to the field of study. Essential themes were created for clustering and reorganizing the disassembled data into groups by coding. This process resulted in 29 different labels, see appendix III.

**Step 4;** Interpretation: The purpose of this step was to find main themes that can form the basis for understanding the entire study. In this step the clustering of the 29 labels resulted in 16 new labels within nine different areas, see appendix III. These areas are the underlying data for the analysis in the next part.

The reassembling (step 3) and the interpretation (step 4) are iterative steps and are gone through several times in order to find patterns. See appendix III for the organization of the labels and areas in relation to the research questions.

# The Findings



# Analysis

In the following the interviews with the eight Danish companies are analyzed. Two things should be taken into consideration, when reading the analysis. Firstly, the interviewees do not represent a wide range of people within the different companies since the levels 1, 7 and 8 in the UX maturity model are not represented in the sample. Secondly, when the interviewees were asked to describe UX in their own words, their approaches were very pragmatic e.g. *“It is something that permeates a product. From the specification phase, where you have to have it incorporated [...] So actually it permeates all the way through the development, where there are continuously testing. So I see it as a major integral part of the product development, in which you have to be acute, because in the end it is what the users see - they do not see the machinery”*. Their descriptions verged on the edge of being a description of usability instead.

Furthermore two of the interviewees did not use the terms UX design and usability, and when asked they told, that they did not perform any UX work at all in the companies. However, further along in the interviews they started using terms as user interface expert, key product drivers, customer satisfaction etc., and it was clear that maybe they did not use the terms usability and UX design, but they did perform both usability and UX work. Again this is something to have in mind when going through the rest of the analysis.

## ***What is the common approach for the companies to start having an interest in user experience design?***

The common approach for the companies to gain an interest in user experience design has been via a grass root movement within the company. The grass root movements have consisted of people with an interest for the end users and how the end users use the company's products. Within the interviewed companies the start of the UX movement has either been in the mechanics or the software department. This makes sense since there within these two fields are a lot to win by having developed the right product or feature to the users, the first time - both regarding time and money and also to reduce the cost of changes by having problems identified early in the development process. But the movement can just grow to a certain extent without having the management encouraging the UX work and posting resources into the project. When the management has a focus on UX within the company, it is important they keep an interest in the UX work, if they do not, the UX movement is pretty sure to wither and die out. But if the management encourages and keep on doing so, the UX work within the company has the potential to grow big and strong.

## ***How do the companies make decisions within the user experience field and is a decision made within this field as powerful as decisions made e.g. within software?***

There seems to be a problem with the resources to make proper UX design work. It reflects in how UX decisions are made within the companies and often the decisions are based on the individual employee's experience, sometimes in combination with a small, internal user test, see fig. 4. But there are not resources to make numerous user tests and time to consult theory within the field. The companies are very result orientated and they have a lot of focus on resources and they have a lot of focus on the economy, which is understandable, as one of the interviewees pointed out: *“We choose what*

features to stay and which ones to go in the products. If a design should have e.g. one less button than the existing product, it would entail that we should invest in a new tool that maybe costs 100.000 dkr. So we, by all means, try to find a function for that extra button”.

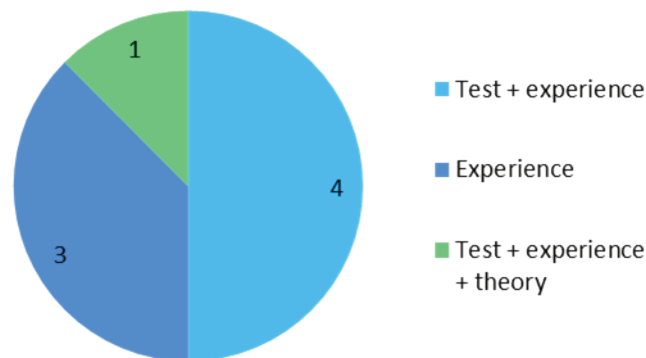


Figure 4: How UX decisions are made within the companies

Two of the interviewees pointed out that UX takes time and sometimes the companies do not show an understanding for that, as one of them pointed out: *“When UX decisions are made, it is something that are done up in our heads. You cannot say, as the developers do, that in order to make this decision, you have to go through these steps. So I find that UX decisions to others seem like something that can be made quickly, and then we do not get enough time devoted to the UX work”*.

Several of the interviewees were meet with the attitude in the company, that UX is just common knowledge, as one of the interviewees pointed out: *“Anyone can comment on something being easy to use [...] this also means that everyone has an opinion about usability and user experience.”* However, three of the interviewees told that UX has a lot of power when it comes to making decisions within the development process, see fig. 5.

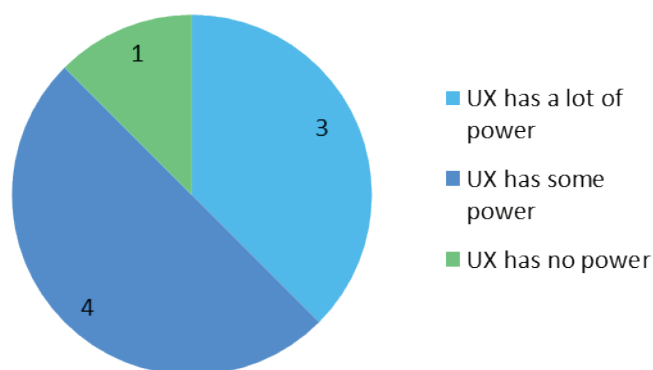


Figure 5: UX decisions strength

Four of the interviewees told that UX has some power, so UX is an integral part of the decisions process within seven of the companies. A peculiar thing is that one of the companies where UX has a lot of decision power do not have employees to make actually UX work.

## ***How do the companies work with user experience (in an agile development)?***

First and foremost the interviews showed that there exists a major lack in described processes within the field of UX design – both in relation to general work with UX, how to test UX and how to communicate results and knowledge within the UX field – both internal within the UX group, if one exists, but also to other departments. Since six out of eight companies points out that their UX processes are ad hoc (see fig. 6), this seems to be one of the biggest problems when working with UX in an agile development context. Furthermore, a couple of the companies pointed out, that the lack of UX processes were a problem, since no one was appointed the responsibility for the UX area and a lot of the UX work were only done, when someone remembered it. One of the interviewees told *“We made a concept, where we had forgotten to have software integrated in the concept”* and another of the interviewees told: *“We had a product, and just a week before release it was decided what a big button in the middle of the product should be used for”*.

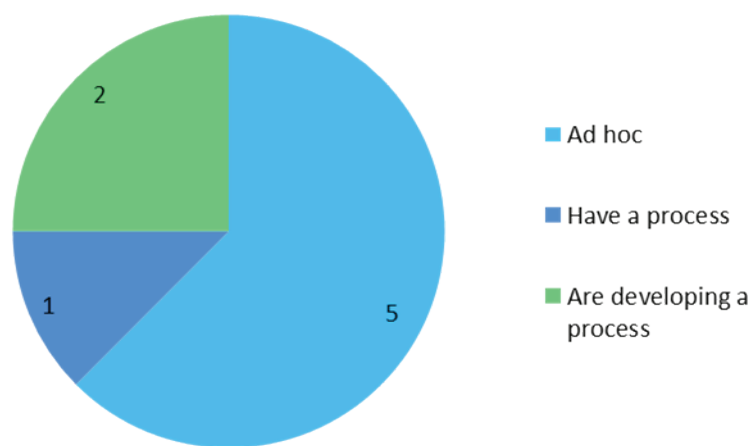


Figure 6: UX process

However the companies are aware of the lack of processes and some of them are trying to develop different processes regarding UX design, as one of the interviewees told: *“I am building a knowledge database, which contains user profiles and some small user stories. Then there will be a clear structure for what the developers should have in mind, which tools they should use and which steps they should take”*.

A good approach could be the approach the company with a UX process has. This company has developed guidelines, procedures on how to make inspections and how to make user tests. The company's approach is a simple approach, which prevent the company from panicking and start making user tests, where they would benefit more from e.g. a heuristic evaluation.

All of the companies are interested in having their users involved in the development process, however the companies are primary using internal staff as surrogates for real users as test subjects, see fig. 7.

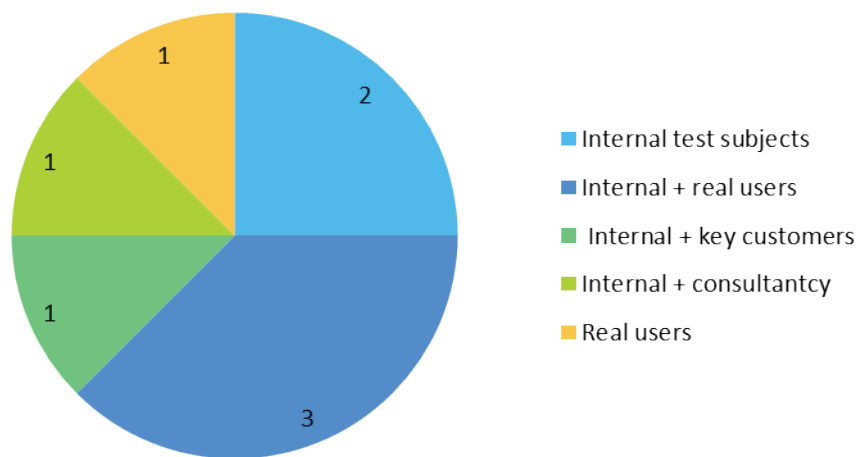


Figure 7: Test subjects

Four of the companies make use of consultancies. The use of consultancies covers gaps within the companies for different competences none of the employees have. However the interviewee from the company, where they use a consultancy for making user test, thought that the company only used consultancies because the management did not now, which UX competences the company have in house.

Regarding test methods and tools, the companies seem to rely on usability test methods more than anything else, as seen in fig. 8. Think aloud testing and Instant Data Analysis (IDA) belong under the term usability testing, however since the companies explicit have said think aloud and IDA, it is chosen to plot them in the diagram.

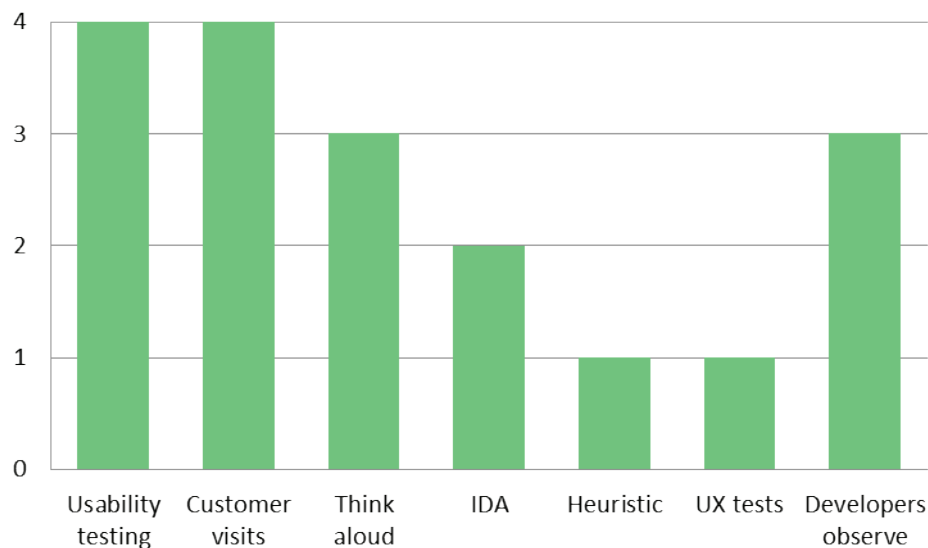


Figure 8: Test methods and tools

Only one of the interviewees told explicit that the company made use of some UX testing methods. As described in the start of the analysis, the interviewees does not distinguish that much between usability and UX and they have a very pragmatically approach to making UX work. Most of the companies use a combination of usability and UX tools and methods. The developers are very interested in observing how the products are handled by the users, three of the companies already have developers seeing the user tests. Five of the companies are keen on the idea of either having the developers make small, internal UX tests themselves, testing some of the features on e.g. test subjects from HR, marketing etc. or have the developers participate in/observe the user test. This could be very beneficial, since the developers probably are focusing on other things than the UX

designers, but also because the developers quickly can see a solution to an observed problem, when they see a user use the product or feature the developer has developed. An idea put forward by one of the interviewees is to use the Rapid Iterative Testing and Evaluation (RITE) in this case.

All the companies are or are trying to minimize the amount of big reports about the user tests and they are going in the direction of making quick presentation in e.g. power point; short stating the findings/results in a prioritized manner, recommendations to the further work and maybe some design suggestions. Furthermore, it is possible to minimize the amount of large reports by having the developers observe the user tests.

### ***Has the companies taken agile development to heart?***

It should be kept in mind, that most of the interviewees work with user experience design and that they therefore do not have much knowledge about how the software development team is using agile development.

However, all of the companies use or have the opportunity to use Scrum. Five of the companies are using Scrum as their only development process and the other three use Scrum in a combination with Lean or a waterfall approach, see fig. 9.

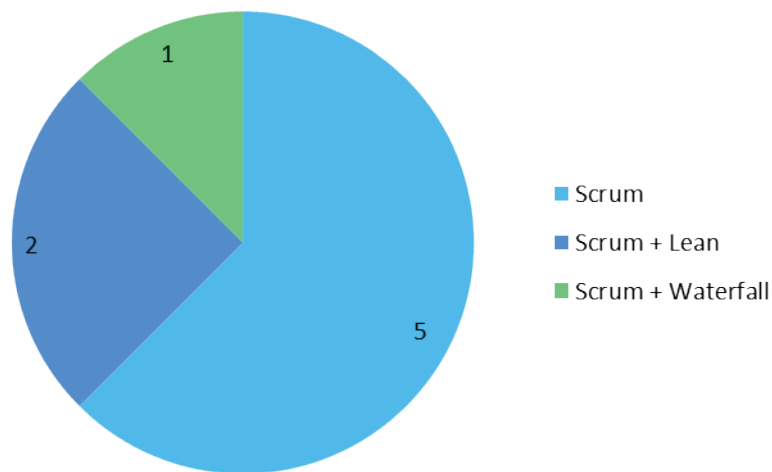


Figure 9: The use of agile development methods within the companies

When talking to the different interviewees, several of them told that the company stated that they worked agile and with Scrum, but the interviewees told that fact was that the company was not that agile as they said they were the and the company was not suited to switch to a whole new product concept at every given point in the development process, unless there were very serious problems with the existing design.

The companies have been using Scrum for a variety of years, see fig. 10. As it can be seen, companies seem to stay with Scrum as the development method, when they first have started using it.

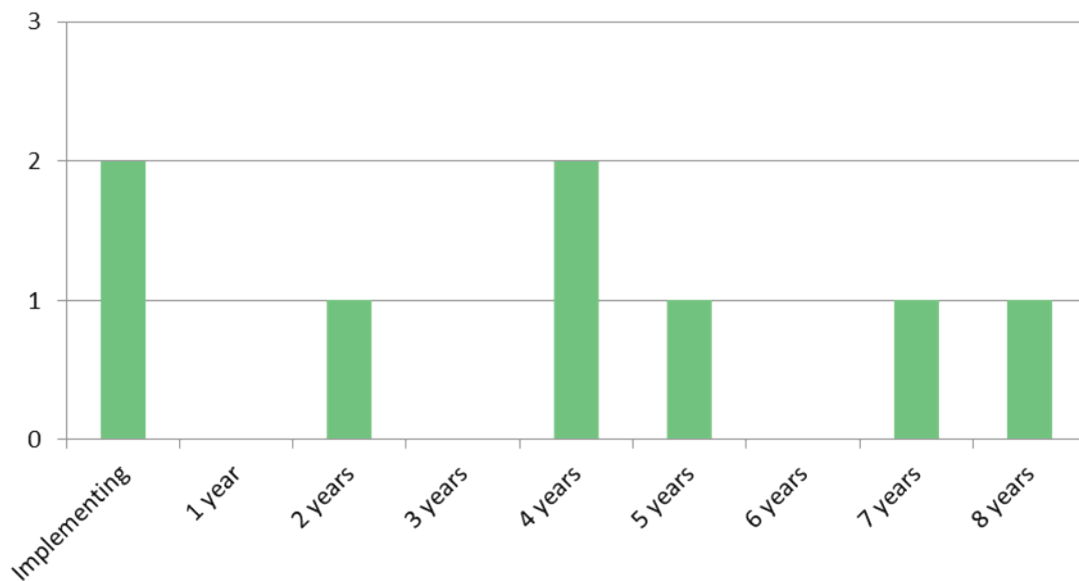


Figure 10: Years of experience with working with Scrum

Even though most of the interviewees worked with UX design and did not have that much experience with how the other development departments worked with Scrum, it seems that the companies use Scrum very seriously and have applied more or less all of the Scrum artifacts, which makes sense, if the company has been working with Scrum for a longer period of time.

### ***Do the companies embrace agile UX?***

All of the companies use or have the opportunity to use Scrum as the software development process, however only three of the companies use Scrum in their UX development, see fig. 11.

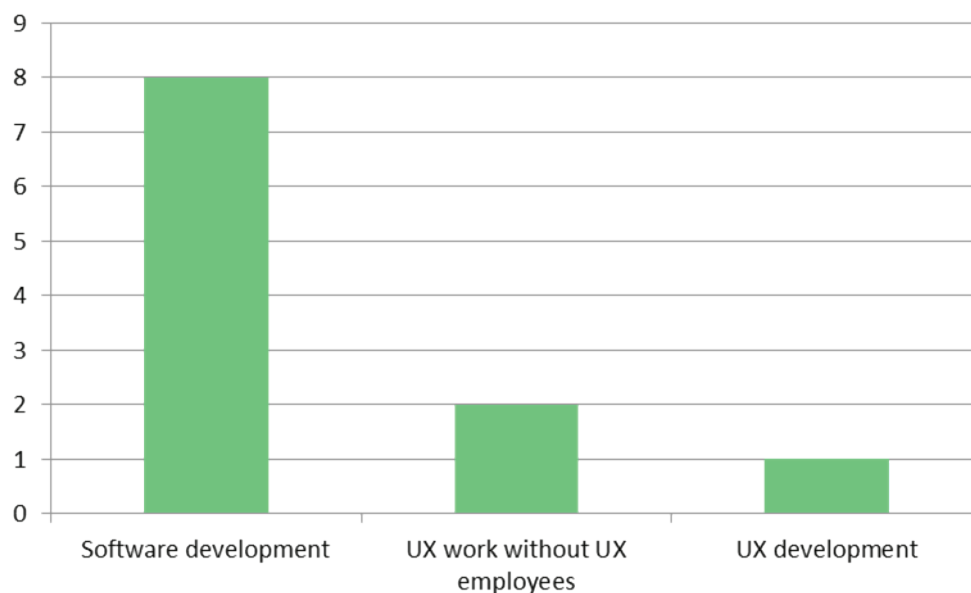


Figure 11: The use of Scrum

Here it should be pointed out, that two of the companies, which are using Scrum for their UX activities, do not have employees working explicit with UX design. In the company where the UX designers are participating in the Scrum rhythm, it is when the UX designers are working on a specific project, instead of just acting as consultants, here the UX designers participate in the Scrum development almost on equal terms as the software

and hardware developers, but they do not have their own story points. Furthermore, one of the companies without a UX employee does very much UX despite of this circumstance, an interesting finding. Four of the companies were very keen on the idea of agile UX, where UX design is fully integrated in the Scrum development. Three were keen on the idea of UX working in separate teams as the software and hardware teams do, one of these companies would like to have the UX department as customers to the software development department, so that the software developers feed the UX department. Only one company was not keen on the idea of agile UX, see fig. 12.

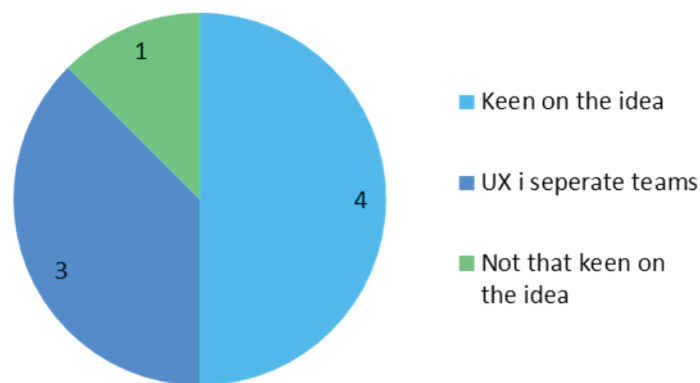


Figure 12: Agile UX

All of the interviewees can see a potential in increasing the work with UX design. The companies are very interested in giving the customers value for their money and a good user experience. If the UX design is integrated in the Scrum process, there are always something to show to the customers and thereby opportunity to get feedback, resulting in an even better product. Furthermore, such an integration can create both a more direct communication but also more synergy between the UX designers and the developers, but also between the developers and the customers. Furthermore, as one of the interviewees pointed out: *“When we started using Scrum, there came a much greater transparency with which things that takes time in a software development”*. This indicates that if UX design and Scrum are integrated, maybe the UX work can be more transparent as well. The organizational placement of the UX designers gave a bit of information and an indication on which approach the companies have taken in order to integrate UX design and agile development, see fig. 13.

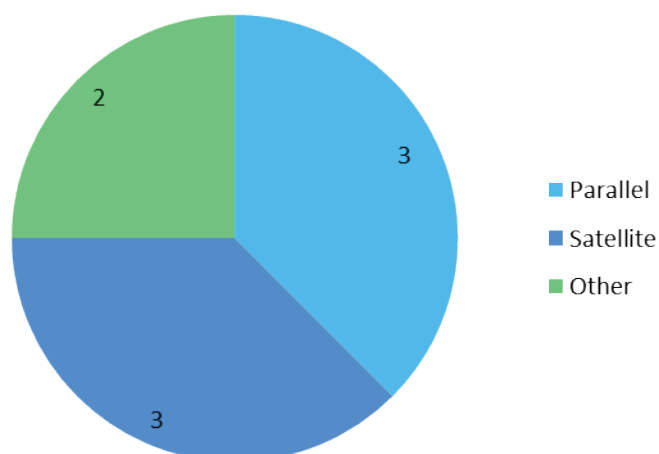


Figure 13: UX approaches within the companies

From what the companies told, three of the companies have an approach to work with UX design, which can be described as working separate from the software development team, but parallel with them - sprints ahead or behind regarding the type of work they are doing, this approach is described by Sy (2007), see appendix I. Three companies use a satellite approach when working with UX design, meaning that the UX team work separate from the development team and maybe with a whole other feature, but have a satellite connection to the development team, this approach is described by Kollmann (2008), see appendix I. The two companies without any UX employees are placed under other approaches.

# Conclusion

Two of the interviewees did say, that their companies did not work with usability and UX design, however when talking with them, it was clear that they did. Furthermore, two of the companies did not have UX employees, but still they managed to do quite much usability and UX work. This indicates that there are being made more usability and UX work within the companies than first presumed. The common approach for the companies to start having an interest in UX design has been via grass root movements within the company. These movements have started either in the software or the mechanics department. It makes sense since these are two departments with much focus on the end-user.

When the companies make decisions UX is in the decision loop and is an important parameter when decisions are made. But there is a lack of described UX processes, which makes this difficult. Furthermore, there is a problem with having enough resources to make proper UX work, this reflects in many UX decisions within the companies are made on the employees experiences and not by e.g. a proper user tests. The companies work with UX design and they are aware of the missing processes and are working on having the UX work formalized, but there is still a way to go.

All of the companies are interested in having the end users involved in the development process, however most of the companies only tests with internal test subjects. In three of the companies the developers have the opportunity to see the user tests and further two of the other interviewees find it a great idea. There is a tendency within all of the companies to minimize the amount of big reports and instead trying to keep the dissemination to a one pager, a quick PowerPoint etc.

The companies have taken Scrum development to heart. All of the companies use or have the possibility to use Scrum as the development process. The tendency is that they stick to it, this is an excellent argument for an integration between Scrum and UX design will be beneficial, since it can be a long term relationship and something that can co-develop, and since the companies are interested in working with UX design in a Scrum development context, this is perfect. Again it is very important that the UX processes are formalized, since it is impossible to implement something, which does not exists.

It seems that the Danish industry embraces agile UX, but there is a long way to go before such an integration is fully done and the first step on the road will be to make a described UX process.



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# Appendices

# Appendix I

## Four different approaches to integrate user experience methodologies and agile development

### Sprint zero

One of the most common approaches is to have the user experience designers run sprints ahead of the rest of the development group, starting by having a phase 0, cycle 0 or sprint 0, see figure A. [Kollmann, 2008; Beyer, 2010; Sy, 2007]

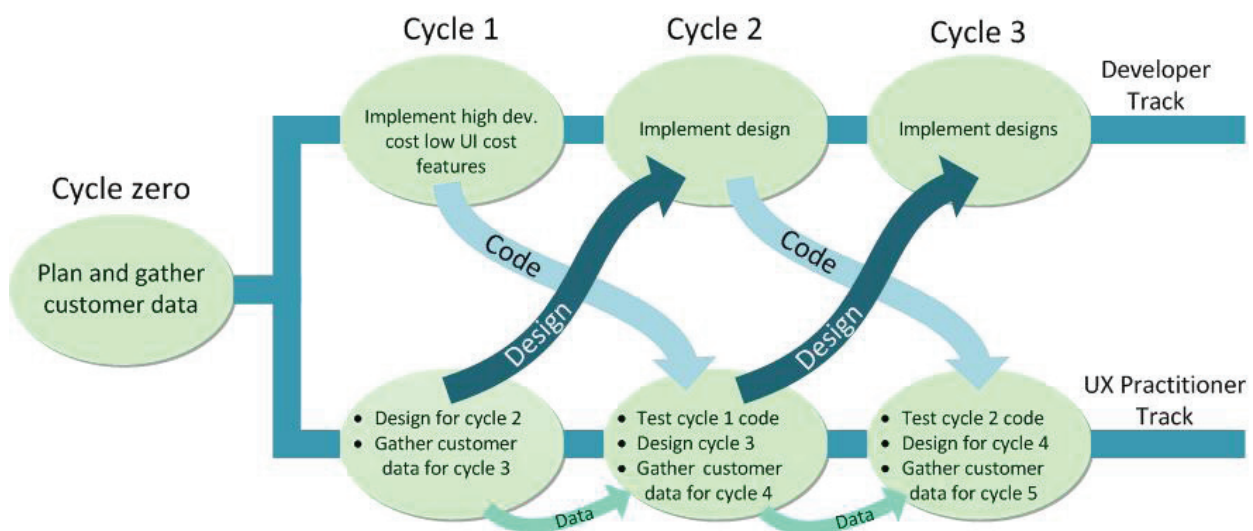


Figure A: Sprint zero framework, where design and development work in separate, but parallel tracks.

In this framework, user experience designers work ahead of the developers in order to be able to feed the development process. Features are designed and validated during the design sprint and implemented during the development sprint. Sy (2007) points out that it is of great importance to have a strong collaboration between user experience designers and developers during both type of sprints, otherwise this can lead to the user experience designers and developers to create some sort of mini waterfall process, where they only communicate when handing over handoffs. [Sy, 2007] This framework is a good transition model, but it is not a permanent solution, since the development will never have the benefits of the cross functional synergy of different professions working together, their focus are at different stages of the development process. Furthermore, another problem can be the absence of developers in the design sprint, when they do not participate they do not have a chance to assess the work for feasibility or scope and can therefore not make it clear what is possible to do, hence the design sprint can be a waste of time. [Gothelf and Seiden, 2013]

## Satellite approach

Another approach has been to have a user experience specialist working as a satellite on the development team, see figure B.

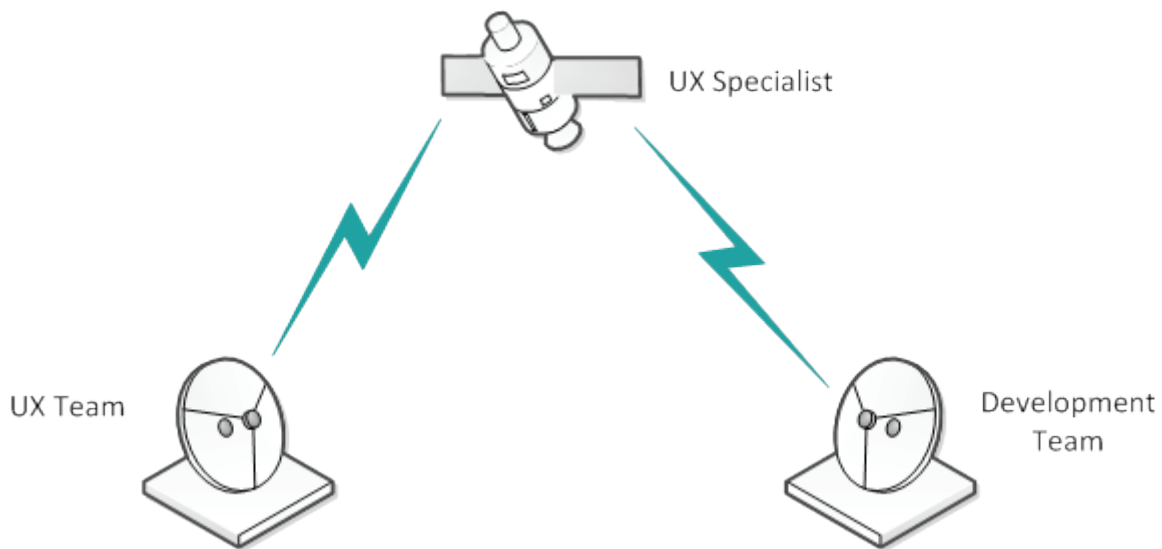


Figure B: The satellite approach

The idea is that this person is supported by other user experience designers outside the development department. The satellite person is to focus on the relationship between the user experience team and the developers and support the process. The rest of the user experience team is to work with the user experience process by e.g. conducting user experience tests, producing prototypes etc. In this way the user experience designers visualize the backlog items, sometimes together with a prototype and a test of it and the developers creates a wireframe or what the goal is in that sprint. Something to have in mind is that companies, who outsource user research or usability testing, for instance like the satellite approach, have a higher amount of end user involvement. But a serious problem with this approach, is that if the satellite person is disconnected from the user experience team, the results from the research and the tests is disconnected from the whole user experience vision. [Kollmann, 2008]

## UScrum

A third approach, when dealing with Scrum as the chosen development process, is to have the role of product owner assigned to two peers, where one represents the traditional role with focus on traditional functions and the other is focusing on usability and user experience, see figure C.

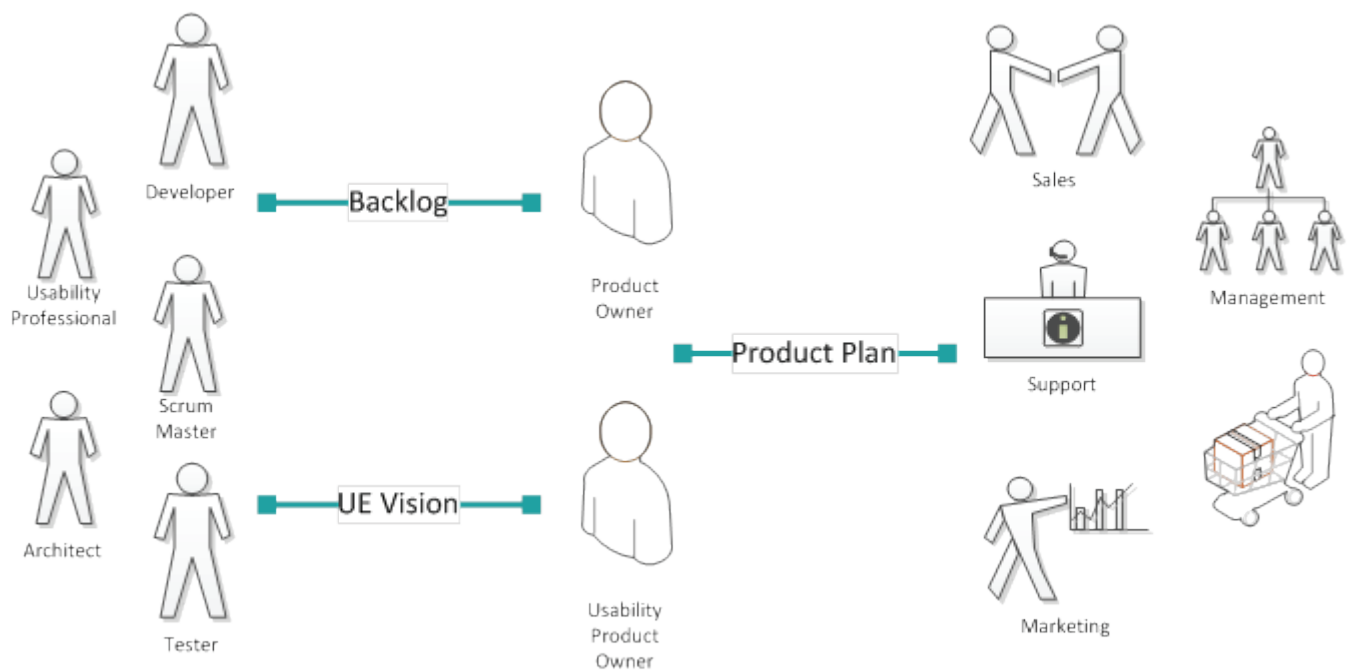


Figure C: The UScrum approach [Singh, 2008]

The usability product owner is reasonable for establishing the user experience vision for the product together with different personas. The product owners' interaction is centred on three artefacts; a project plan, a user experience vision and a backlog. The UScrum approach is well-suited for products which are novel and complex. If a topic is well-known, the advantage is not big enough in relation to having the coordination overhead in having two product owners. [Singh, 2008]

## Lean UX

A forth approach is Lean UX. In Lean UX the aim is to bring the nature of the product forward faster, in a cross-functional, collaborative way, while reducing the heavy documentation and increase the focus on a shared understanding of the product being made, this is done by four phases.

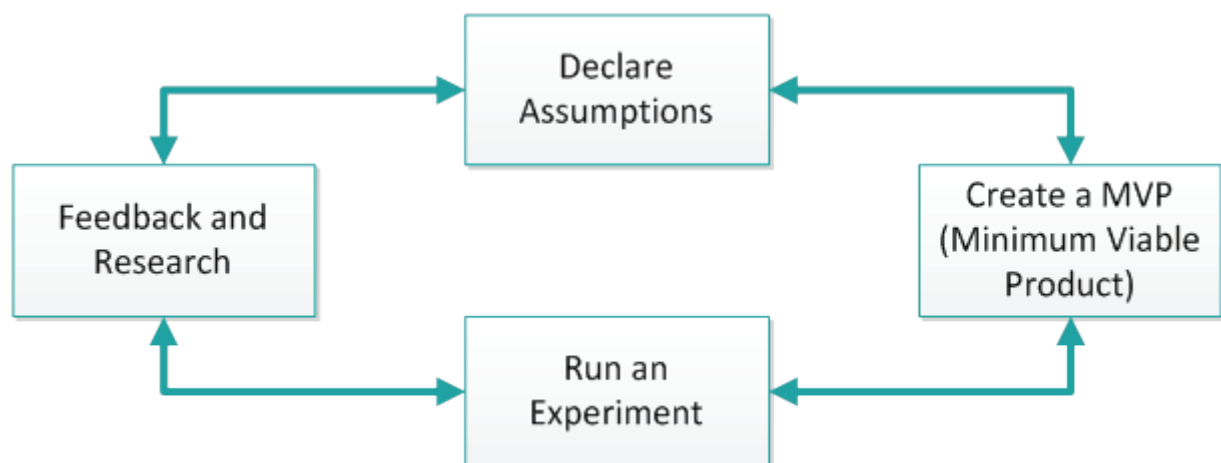


Figure D: The four phases of Lean UX

1. Declare assumptions: When using Lean UX, the first step is to declare the assumptions regarding the project. By declaring the assumptions the team can create a common starting point and by that give every team member the chance to discuss opinions and ideas on how to solve the different problems in the project, see figure D.

# Appendix II

## Presentation of the companies

**Atosho** is a business-to-consumer company developing micro shops and distributed e-commerce on the Internet. They have 15 employees in Denmark.

Interviewee: Krestina Petersen Warming, email: krestina@atosho.com

**BAE Systems Detica GCS** is a business-to-business telecommunication company with 250 employees in Denmark.

Interviewee: Sigrid Boesen, email: Sigrid.Boesen@baesystemsdetica.com

**Brüel&Kjær** (Sound and Vibration Measurement A/S) is a business-to-business company developing sound and vibration measurement equipment, systems and solutions. They have 500 employees in Denmark.

Interviewee: Mihai Marinescu, email: Mihai.Marinescu@bksv.com

**FOSS Analytical** is a business-to-business company developing and producing analytical solutions for different products. They have 450 employees in Denmark.

Interviewee: Sussie My Nikolajsen, email: smn@foss.dk

**GN Netcom** is a business-to-business and a business-to-consumer company developing and producing audio products and telecommunication solutions. They have 300 employees in Denmark.

Interviewee: Steffen Damkjær Hansen, email: sdhansen@jabra.com

**NN (wishes to be anonymous)** is a primary business-to-business financial company with more than 4,000 employees in Denmark.

**Radiometer Medical** is a business-to-business company developing and producing medical devices. They have 1,000 employees in Denmark.

Interviewee: Sune Yndgaard Sørensen, email: Sune.Soerensen@radiometer.dk

**TC Electronic** is a business-to-consumer company developing and producing audio products. They have 100 employees in Denmark.

Interviewee: Jesper Lumbye Andersen, email: JesperLA@TCElectronic.com

# Information about the companies and the interviewees

Due to anonymity the companies are randomized when presenting the following.

**Company A** has one person working with user experience design fulltime and four frontend developers are interested in the field of user experience design. The company has been working with Scrum for the past five years and has been working with user experience design for nine years.

The interviewee work as a user experience designer, she has been working at the company for almost two years. She has a background as Engineering Psychologist from Aalborg University (AAU).

**Company B** has no employees working with user experience design, but one developer is very interested in user experience and is working on getting a Master's degree in usability. They have been working with Scrum for the past four years and have close to none experience working with user experience design.

Interviewee A work as a development engineer, he has been working at the company for 15 years. He has a background as Acoustic Engineer. Interviewee B work as a Product Manager, he has been working at the company for 11 years. He has a Master in philosophy and media science.

**Company C** has no employees working fulltime with user experience design, but two employees use some of their working time on user experience design. Furthermore, they have a usability taskforce, where software developers, analysts and people with interest within the fields of usability and user experience design participate. They have close to none experience with Scrum, since it is something they are starting to implement, they have had focus on user experience design for four years.

The interviewee work as Senior Method Consultant, he has been working at the company for two years. He has a background as a Master of Informatics and a PhD in usability.

**Company D** has eight employees working with user experience design, they have a background as Industrial designers, people from Design and Innovation at the Technical University of Denmark (DTU), Masters of computer science, designers and engineering psychology from AAU. The company has been working with Scum for approximately two years and there have been user experience design activities for the past 10 years, and the UX group was formed 1.5 years ago.

The interviewee work as a User Experience Specialist, he has been working at the company for 1.5 years. He has a background as an Engineering Psychologist from AAU.

**Company E** has one working fulltime with user experience design and one, a designer, is working approximately half time on user experience design. It is a newly established company so they do not have a lot of experience with neither Scrum nor user experience design.

The interviewee work as a User Experience Engineer, she has been working at the company for six months. She has a background as an Engineering Psychologist.

**Company F** has no employees working with user experience design fulltime, they have a user interface designer working on the user interface and a handful of the software developers are interested in user experience design. The company has been working with Scrum for the past eight years and there have been initiatives to do user experience activities the last couple of years.

The interviewee work as a Team and Project Manager, he has been working at the company for 10 years. He has a background as an Electronics Engineer.

**Company G** has three employees working with user experience design and concept design and one are working with user interface, their background is as physician/mechanical engineer, mechanical engineer and software engineer. Furthermore between 10 and 15 are interested in user experience design. The company has been working with Scrum for the past eight years and with user experience design.

The interviewee work as Concept Developer, she has been working at the company for eight years. She has a background as Mechanical and Optical Engineer and has a PhD in Optical Physics.

**Company H** has three employees working fulltime with user experience design (from engineering psychology at AAU and from Design and Innovation at DTU) and four are working part time (business analyst, student workers, and interns) with user experience design, furthermore four developers with in the fields of mechanics and software are interested in user experience design The company has been working with Scrum for the past four years. There has been user experience design activities in the company for the past 20 years and within the last four years people have been employed to do user experience design work.

The interviewee work as a Project Manager, he has been working at the company for 1.5 years. He has a background as an Electronics Engineer.



# Appendix III

The organization of the labels and the areas in relation the research questions

